DA-681 Series Embedded Computer
Hardware User's Manual

First Edition, January 2009

www.moxa.com/product

© 2009 Moxa Inc. All rights reserved.
Reproduction without permission is prohibited.

DA-681 Series Embedded Computer Hardware User's Manual

Any software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

Copyright Notice

Copyright © 2009 Moxa Inc.
All rights reserved.
Reproduction without permission is prohibited.

Trademarks

MOXA is a registered trademark of Moxa Inc.
All other trademarks or registered marks in this manual belong to their respective manufacturers.

Disclaimer

Information in this document is subject to change without notice and does not represent a commitment on the part of Moxa.

Moxa provides this document "as is," without warranty of any kind, either expressed or implied, including, but not limited to, its particular purpose. Moxa reserves the right to make improvements and/or changes to this manual, or to the products and/or the programs described in this manual, at any time.

Information provided in this manual is intended to be accurate and reliable. However, Moxa assumes no responsibility for its use, or for any infringements on the rights of third parties that may result from its use.

This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

Technical Support Contact Information

www.moxa.com/support

Moxa Americas:
Toll-free: 1-888-669-2872
Tel: +1-714-528-6777
Fax: +1-714-528-6778

Moxa China (Shanghai office):
Toll-free: 800-820-5036
Tel: +86-21-5258-9955
Fax: +86-10-6872-3958

Moxa Europe:
Tel: +49-89-3 70 03 99-0
Fax: +49-89-3 70 03 99-99

Moxa Asia-Pacific:
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231

Table of Contents

Chapter 1 Introduction 1-1

Overview 1-2
Model Descriptions and Package Checklist 1-2
Appearance 1-3
Dimensions 1-3
Features 1-4
Hardware Block Diagram 1-5
    DA-681 Basic System 1-5
Hardware Specifications 1-5
    Basic Systems 1-6
Non-standard Baudrates 1-8

Chapter 2 Hardware Installation 2-1

Placement Options 2-2
    Desktop 2-2
    Rack mounting 2-2
Wiring Requirements 2-4
Connecting the Power 2-5
Reset Button 2-6
Front Panel LED 2-7
Connecting to a Display 2-8
Connecting a PS/2 Keyboard and Mouse 2-8
Connecting USB Devices 2-9
LAN Ports 2-9
Upgrading the Memory Module 2-10
Installing a CompactFlash Card 2-12
Installing a SATA Hard Disk 2-15

Chapter 3 BIOS Setup 3-1

Entering the BIOS Setup Utility 3-2
Modifying the BIOS Main Settings 3-2
    Basic Configuration 3-2
    System Security 3-3
Advanced Settings 3-4
    Hard Disk Boot Priority 3-4
    Advanced BIOS Features 3-4
    CPU Features 3-5
    Advanced Chipset Settings 3-7
    PnP/PCI Configurations 3-8
    Frequency/Voltage Control 3-9
Peripherals 3-9
    OnChip IDE Device 3-10
    Onboard Device 3-11
    Onboard I/O Chip Setup 3-12
Power 3-12
    Wake Up Control 3-13
Hardware Monitor 3-14
Load Defaults 3-14
Exiting the BIOS Setup 3-15
Upgrading the BIOS 3-16

Appendix A Safety Installation Instructions A-1
Appendix B Regulatory Statement Approval B-1

1

Introduction

Thank you for purchasing the Moxa DA-681 series x86-based industrial ready-to-run embedded computer.

This manual introduces the hardware installation, connector interfaces and BIOS setup of the DA-681. For software configuration and management, please refer to the user's manual for your operating system.

This chapter covers the following topics:

- **Overview**
- **Model Descriptions and Package Checklist**
- **Appearance**
- **Dimensions**
- **Features**
- **Hardware Block Diagram**
  - DA-681 Basic System
- **Hardware Specifications**
  - Basic System
- **Non-standard Baudrates**

Overview

The DA-681 computer is based on the Intel x86 processor and supports VGA, 6 Ethernet ports, 4 RS-232 and 8 RS-485 serial ports with optical isolation, CompactFlash, and USB. The DA-681 comes in a standard 19-inch, 1U high form factor, making it an ideal platform for industrial applications.

With its robust design, the DA-681 is suitable for industrial automation applications that require standard 19-inch rackmount solutions, such as power automation, transportation, and oil and gas. Another plus is that the serial ports come with 2 KV optical isolation protection to guarantee communication reliability in harsh industrial environments.

The DA-681 runs Linux, WinCE 6.0, or Windows XP Embedded (pre-installed), providing a friendly environment for developing sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and helps programmers develop bug-free code quickly and at a lower cost.

Model Descriptions and Package Checklist

The DA-681 Series includes the following models:

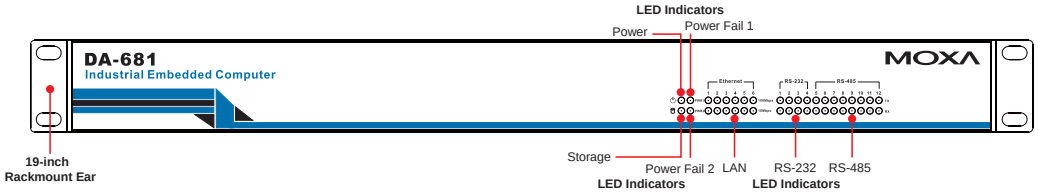
- **DA-681-I-SP-CE:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Single Power, WinCE 6.0
- **DA-681-I-SP-XPE:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Single Power, WinXPe SP2
- **DA-681-I-SP-LX:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Single Power, Linux 2.6
- **DA-681-I-DP-CE:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Dual Power, WinCE 6.0
- **DA-681-I-DP-XPE:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Dual Power, WinXPe SP2
- **DA-681-I-DP-LX:**
  x86 Ready-to-Run Rackmount Computer with VGA, 6 Ethernet, 4 RS-232, 8 RS-485, CompactFlash, SATA, USB, Dual Power, Linux 2.6

Each model is shipped with following standard items:

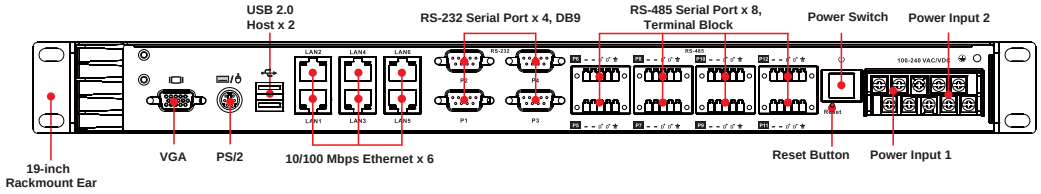
- 1 DA-681 Embedded Computer
- Quick Installation Guide
- Documentation & Software CD
- Ethernet Cable: RJ45 to RJ45 cross-over cable, 100 cm
- Product Warranty Statement

Appearance

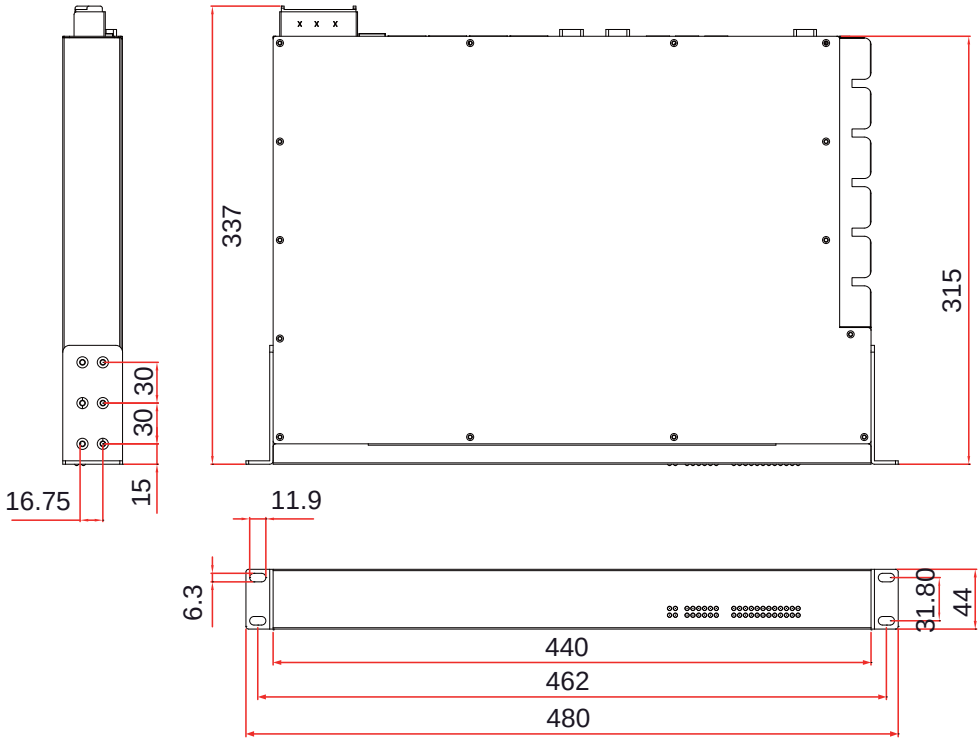
Front View



Rear View



Dimensions



Features

The DA-681 Basic System has the following features:

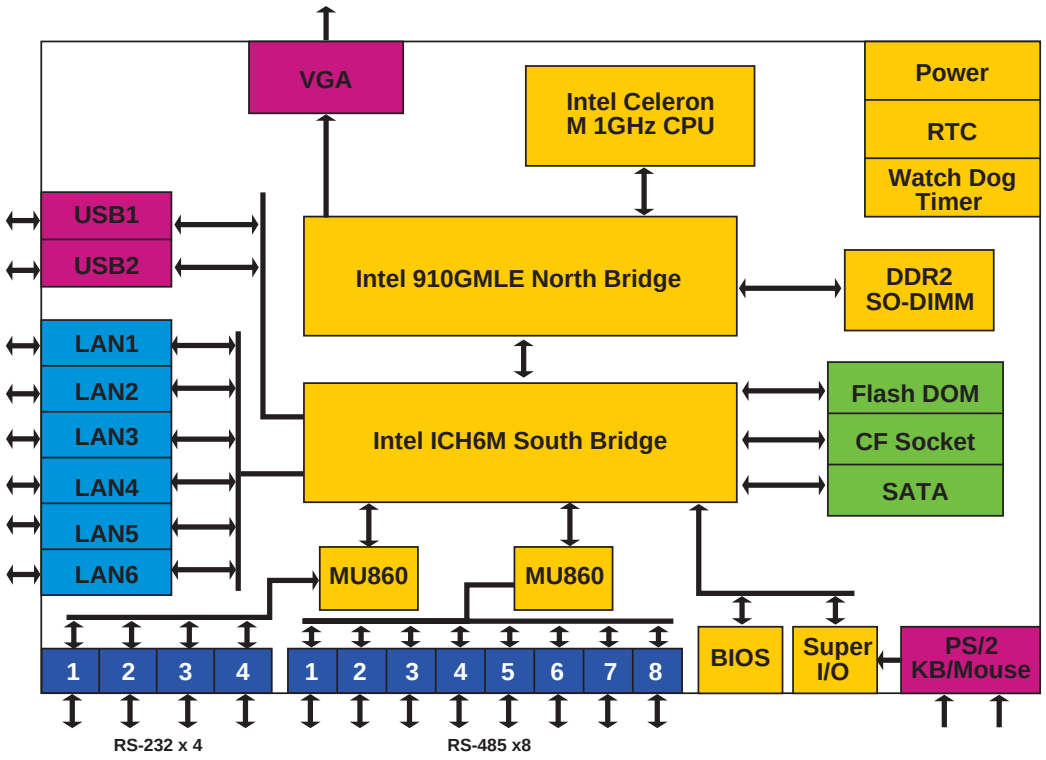
- Intel Celeron M 1 GHz processor with 400 MHz FSB
- 1 x 200-pin DDR2 SODIMM socket, supporting DDR2 400 up to 1GB (512 Mb built-in)
- Six 10/100 Mbps Ethernet ports
- 1 CompactFlash socket, 1 IDE and serial ATA-150 connectors for storage expansion
- USB 2.0 ports for high speed peripherals
- 4 isolated RS-232 and 8 isolated RS-485 ports
- Serial port speed from 50 to 921.6 Kbps, supporting nonstandard baudrates
- Specific design for heat dissipation
- Embedded Linux, WinCE 6.0, or WinXPe platform
- 19-inch rackmount model, 1U high
- 100-240 VAC/VDC power input (Dual Power models offer power redundancy function)
- Fan-less design

ATTENTION

Refer to the "Non-standard Baudrates" section for instructions on how to calculate which baudrates are supported.

Hardware Block Diagram

DA-681 Basic System



Hardware Specifications

DA-681 series embedded computers support peripheral expansion through two expansion slots located on the DA-681 Basic System.

Basic Systems

	DA-681-CE	DA-681-LX	DA-681-XPE
Computer			
CPU	Intel Celeron M 1 GHz processor		
OS (pre-installed)	WinCE 6.0	Linux 2.6	Windows XP Embedded SP2
System Chipset	Intel 910GMLE + ICH6M chipset		
FSB	400 MHz		
BIOS	4 mega-bit Flash BIOS, PCI Plug & Play, ACPI function support		
System Memory	1 x 200-pin DDR2 SODIMM socket supporting DDR2 400; up to 1 GB max. (512 MB built-in)		
DOM:	1GB SSD (DOM) onboard to store OS via IDE interface		
HDD Support	SATA connector for HDD expansion		
CompactFlash	CompactFlash Type-I/II socket available for storage expansion with DMA mode support		
Other Peripherals			
USB	USB 2.0 compliant hosts x 2, Type A connector, supports system boot up		
KB/MS	1 PS/2 interface, support standard PS/2 keyboard and PS/2 mouse via Y-type cable (0ptional)		
Display			
Graphics Controller	Integrated graphics with built-in Intel 910GMLE, and built-in Intel extreme Graphics 2 technology		
Display Memory	Dynamic video memory (shares up to 32 MB of system memory)		
Display Interface	CRT Interface for VGA output (DB15 female connector)		
Resolution	CRT display mode with pixel resolution up to 2048 x 1536 at 75Hz		
Ethernet Interface			
LAN	Auto-sensing 10/100 Mbps Ethernet x 6, using Realtek RTL8110SC Controller		
Magnetic Isolation Protection	1.5 KV built-in		
Serial Interface			
Number of Ports	RS-232 x 4, RS-485 x 8		
Serial Standards	RS-232, RS-485		
Connectors	RS-232: DB9 connector, RS-485: terminal block		
ESD protection	15 KV for all signals		
Optical Isolation Protection	2 KV		
Serial Communication Parameters			
Data Bits	5, 6, 7, 8		
Stop Bits	1, 1.5, 2		
Parity	None, Even, Odd, Space, Mark		
Flow Control	RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485		

Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported; see next page for details)
Serial Signals	
RS-232	TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-485-2w	Data+, Data-, GND
LEDs	
System	Power x 1, Storage x 1, Power 1 Fail x 1, Power 2 Fail x 1
LAN	10 Mbps x 6, 100 Mbps x 6
Serial	RS-232 TX x 4, RX x 4, RS-485 TX x 8, RX x 8
Physical Characteristics	
Enclosure	SECC sheet metal (1 mm)
Weight	4.5 kg
Dimensions	440 x 253 x 45 mm (17.32 x 9.96 x 1.77 in)
Mounting	Standard 19-inch rackmount
Switches and Buttons	
Reset Button	To reset system hardware (on rear panel)
Environmental Limits	
Operating Temperature	-10 to 60°C (14 to 140°F)
Operating Humidity	5 to 95% RH
Storage Temperature	Standard Models: -20 to 80°C (-4 to 176°F)
Power Requirements	
Input Voltage	100 to 240 VAC/VDC auto-ranging (47 to 63 Hz for AC input), single power for SP models, dual power for DP models; dual power models offer power redundancy function
Power Consumption	50W
Input Rating	100-240VAC, 47-63Hz, 1.0A-0.5A
Regulatory Approvals	
EMC	FCC, CE (Class A), EMC level 4
Safety	LVD, UL cUL, CCC
Reliability	
Alert Tools	Built-in buzzer and RTC (real-time clock) with battery lithium backup
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/warranty

Non-standard Baudrates

Moxa's UART ASIC, supports most non-standard baudrates in the range 50 bps to 921.6 Kbps. In fact, supported baudrates are much denser towards the lower values. For example, no baudrates are supported between the integers 5320 and 5323, but 49 baudrates are supported between the integers 387 and 388. Of course this is the way it should be, since serial devices that require using non-standard baudrates generally use slower baudrates.

Before using a serial device that requires using a non-standard baudrate, you must first check that the DA-681 supports a baudrate within the tolerance specified by the serial device manufacturer.

Use the following formula to calculate which baudrates are supported by the DA-283:

(A) Baudrate = 921600/(N+M/8) bps, for N = 1, 2, …, 18431, M = 0, 1, 2, …, 7

or

(B) Baudrate = 8 x 921600/K bps, for K = 8, 9, …, 147456

If you are a programmer and you need to write a driver for your serial device, then you may need to use formula A. If you have a serial device that requires using a non-standard baudrate, then you can use formula B to determine if the DA-681 supports a baudrate within the tolerance specified by the serial device manufacturer.

Example: Your serial device requires using a baudrate of 5340 bps and has a tolerance of 2 bps. Can the DA-681 be used with this device?

Solution: Set formula B to the desired baudrate and then solve for K.

8 x 912600/K = 5338 ==> K = 1367.703259…

This shows that the supported baudrate closest to 5340 comes from setting K=1367 or K=1368.

K=1368 ==> Baudrate1 = 5336.842105...

K=1367 ==> Baudrate2 = 5340.746159…

Since 5338 – Baudrate1 < 2, we can see that the DA-681 supports the serial device.

Note that we can use formula A to generate the so-called "standard" baudrates, which come from setting M=0, and setting N equal to certain integers.

Standard Baudrates						
Baudrate	**N**	**M**		**Baudrate**	**N**	**M**
921600	1	0		4800	192	0
460800	2	0		2400	384	0
230400	4	0		1800	512	0
115200	8	0		1200	768	0
57600	16	0		600	1536	0
38400	24	0		300	3072	0
19200	48	0		150	6144	0
9600	96	0		75	12288	0
7200	128	0		50	18432	0

WARNING

Communication between a serial device and a Moxa UART port may not work correctly if the serial device uses a baudrate that it not within the correct tolerance of a baudrate calculated from either formula A or formula B.

2

Hardware Installation

The DA-681 Series of embedded computers are compact and rugged, making them suitable for industrial applications. The LED indicators allow users to monitor performance and identify trouble spots quickly, and multiple ports are provided for connecting a variety of different devices. The DA-681 embedded computers come with a reliable and stable hardware platform that lets you devote the bulk of your time to application development. This chapter describes hardware installation and connector interfaces of the DA-681 embedded computers.

This chapter covers the following topics:

- **Placement Options**
  - Desktop
  - Rack mounting
- **Wiring Requirements**
- **Connecting the Power**
- **Reset Button**
- **Front Panel LED**
- **Connecting to a Display**
- **Connecting a PS/2 Keyboard and Mouse**
- **Connecting USB Devices**
- **LAN Ports**
- **Upgrading the Memory Module**
- **Installing a CompactFlash Card**
- **Installing a SATA Hard Disk**

Placement Options

Desktop

Place your DA-681 on a clean, flat, well-ventilated desktop. For better ventilation, leave some space between the DA-681 and other equipment. Do not place equipment or objects on top of the DA-681, as this might damage the computer's internal components.

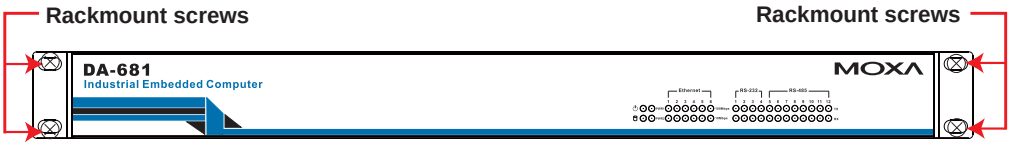
Rack mounting

The DA-681 has rackmount supports for installing the embedded computer on a standard rack.

ATTENTIONS

1. For maximum safety, at least two persons should work together to lift, place, and attach the embedded computer to the rack.
2. Before you lift or move the embedded computer, make sure that the embedded computer is turned off and the power to the rack system is turned off.

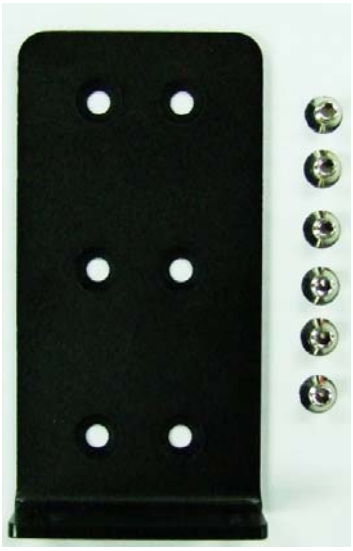
Four rackmount screws are required to attach the DA-681 to a standard rack.



Follow these steps to install the DA-681 on a rack.

Step 1: Installing the rackmount supports.

Take the rackmount supports out of the packages. There are two rackmount ears and 12 screws. Each ear requires 6 screws to attach to the rack.



Step 2: Installing the rackmount ears to the DA-681.

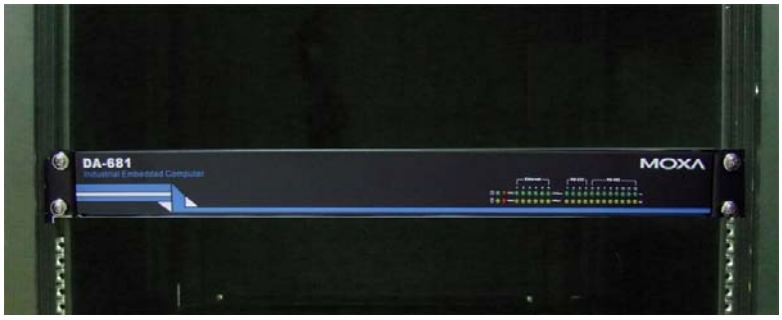
Use 6 screws to attach one rackmount ear to one side of the DA-681. Repeat this procedure for the ear on the other side of the DA-681.

Step 3: Installing the DA-681 to a rack.

Gently slide the DA-681 onto the rack, and then use screws provided by the rack supplier to fix the rackmount support to the rail.

Note that four screws are required to attach the DA-681 to the rack. Use two screws on the left side and two screws on the right side.

As a final check, make sure that the four screws are firmly attached to the rack.



Wiring Requirements

The following common safety precautions should be observed before installing any electronic device:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- When necessary, it is strongly advised that you label wiring to all devices in the system.

ATTENTION

Do not run signal or communication wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your device.

Electrical Current Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

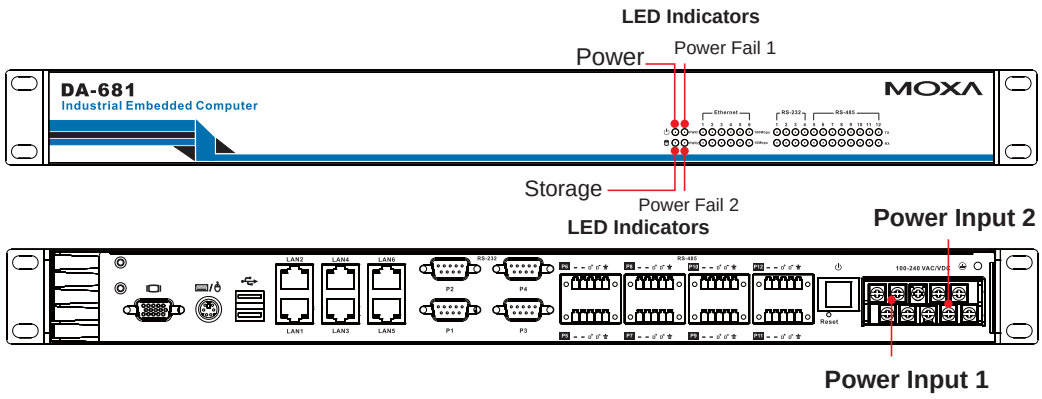
If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Temperature Caution!

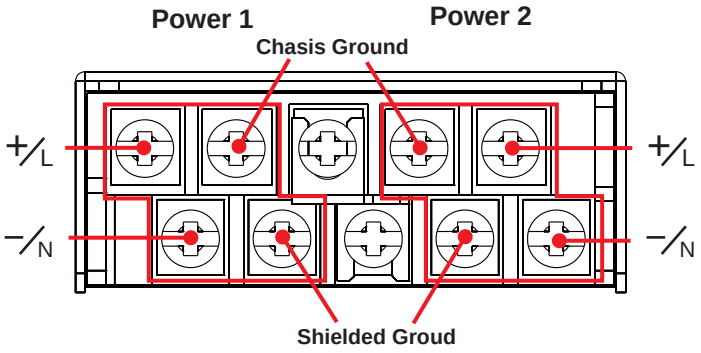
Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power

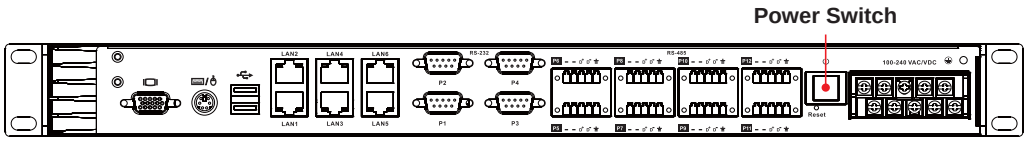
The DA-681 offers both single power and dual power inputs. Use a screwdriver to remove the screws. Connect the power cord to the screws and then attach the screws to the unit. For single power models, use Power 1 only; for dual power models, use both Power 1 and Power 2 for power input installation. Refer to the following figure for detailed information. It will take about 30 to 60 seconds for your operating system to boot up.



PWR 1			PWR 2	
+/L	⏚	NC	⏚	+/L
−/N	⏚	NC	⏚	−/N

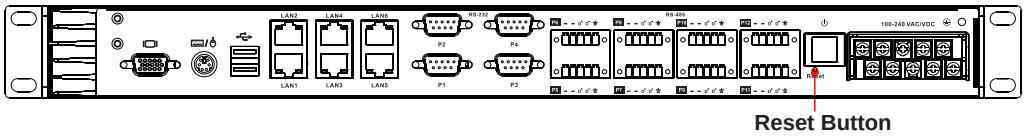


When finished, press Power Switch button to start the system.



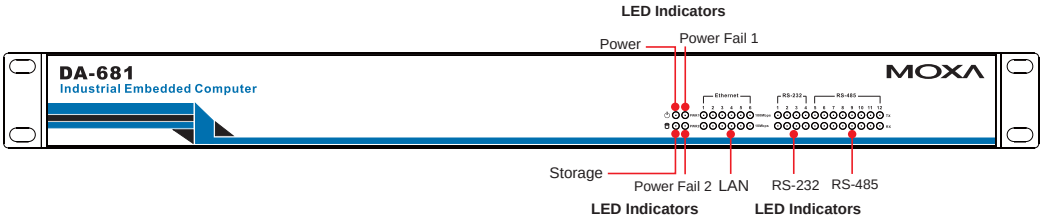
Reset Button

Pressing the Reset button initiates a hardware warm reboot. The button plays the same role as a desktop PC's reset button. After pressing the reset button, the system will reboot automatically. During normal use, you should NOT use the Reset Button. You should only use this button if the software is not working properly. To protect the integrity of data being transmitted or processed, you should always reset the system from the operating system with the software reboot function.



Front Panel LED

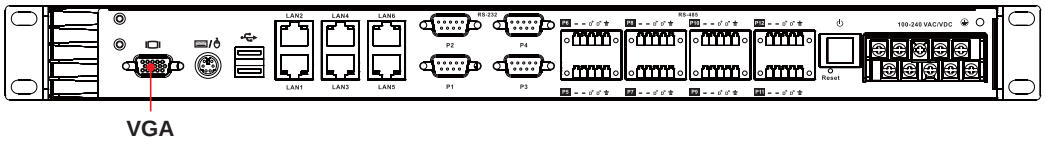
There are 40 LED indicators on the front panel. Information about each LED is given in the following table.

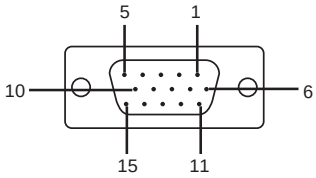


LED Name	Color	LED Description
Power	Green	Power is on
	Off	No power input or power error
Storage	Yellow / Blinking	Data is being written to or to read from the storage unit
	Off	Storage unit is idle
Ethernet Port 100 Mbps	Green	100 Mbps of Ethernet Port is active
	Off	No activity
Ethernet Port 10 Mbps	Yellow	10 Mbps of Ethernet Port is active
	Off	No activity
Serial Port TX 1-12	Green	Serial port is transmitting data
	Off	No operation
Serial Port RX 1-12	Yellow	Serial port is receiving data
	Off	No operation
Power Fail 1	Red	Power 1 fails (For dual power models only)
	Off	Power works well
Power Fail 2	Red	Power 2 fails (For dual power models only)
	OFF	Power works well

Connecting to a Display

Your DA-681 embedded computer comes with a D-Sub 15-pin female connector to connect to the VGA monitor. Be sure to remove the power before you connect or disconnect the monitor cable.

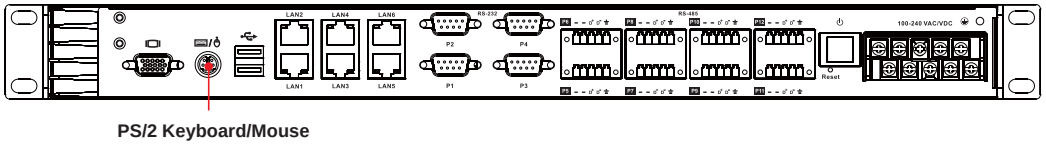


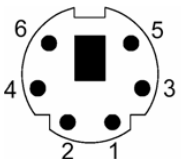


Pin No.	Signal Definition
1	RED
2	GREEN
3	BLUE
4	---
5	GND
6	CRT_DETECT#
7	GND
8	GND
9	+5V
10	GND
11	---
12	DDC_DATA
13	HSYNC
14	VSYNC
15	---

Connecting a PS/2 Keyboard and Mouse

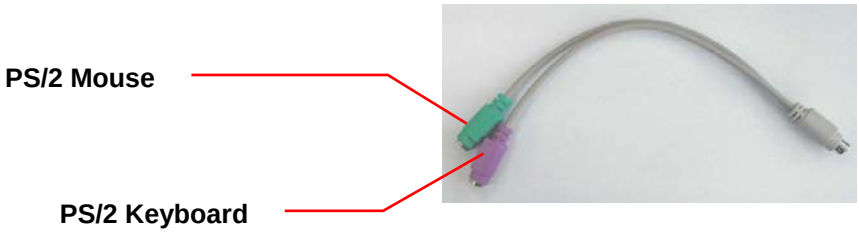
Your DA-681 embedded computer comes with a PS/2 mini-DIN connector to connect to a PS/2 keyboard and PS/2 mouse. This 6-pin mini-DIN connector has the pin assignments shown below.





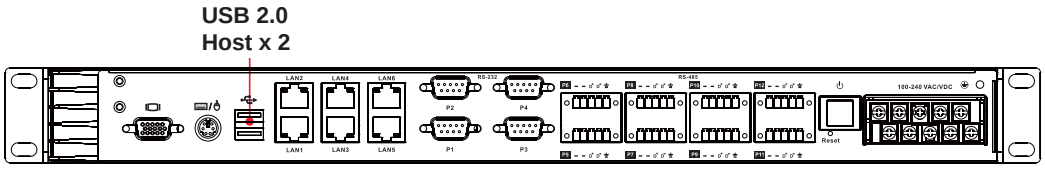
Pin No.	Signal Definition
1	PS/2 Keyboard Data
2	PS/2 Mouse Data
3	GND
4	VCC
5	PS/2 Keyboard Clock
6	PS/2 Mouse Clock

Use the Y-type cable to convert the mini-DIN connector into two 6-pin mini-DIN connectors to connect both a PS/2 keyboard and PS/2 mouse at the same time. (The Y-type cable is not included in the accessory package. It should be purchased separately. You may also use the USB ports to connect your USB-based keyboard and mouse.)



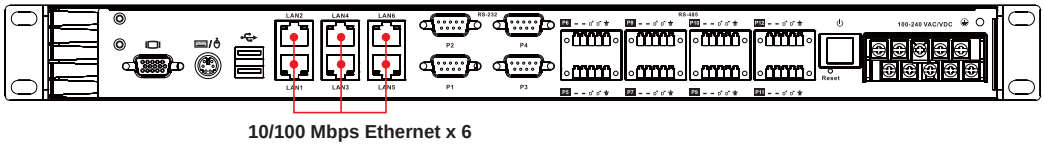
Connecting USB Devices

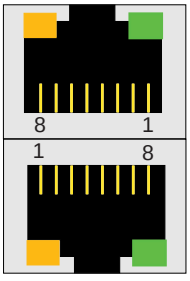
The DA-681 embedded computer has two USB 2.0 ports on the rear panel. All of the ports are UHCI, Rev 2.0 compliant and support Plug & Play and hot swapping. These ports can be used to connect USB devices, such as a keyboard, mouse, USB flash disk, and USB CD-ROM. In addition, both USB ports support system boot up, which can be activated by modifying the BIOS settings. The chapter "BIOS Setup" describes the configuration process in detail.



LAN Ports

The DA-681 has 6 10/100 Mbps LAN ports. When the cable is properly connected, the LEDs on the RJ45 connectors will glow to indicate a proper connection.





Pin No.	Signal Definition
1	TX+
2	TX-
3	RX+
4	---
5	---
6	RX-
7	---
8	---

LED	Color	Description
Ethernet Port 100 Mbps	Green	100 Mbps of Ethernet Port is active
	Off	No activity
Ethernet Port 10 Mbps	Yellow	10 Mbps of Ethernet Port is active
	Off	No activity

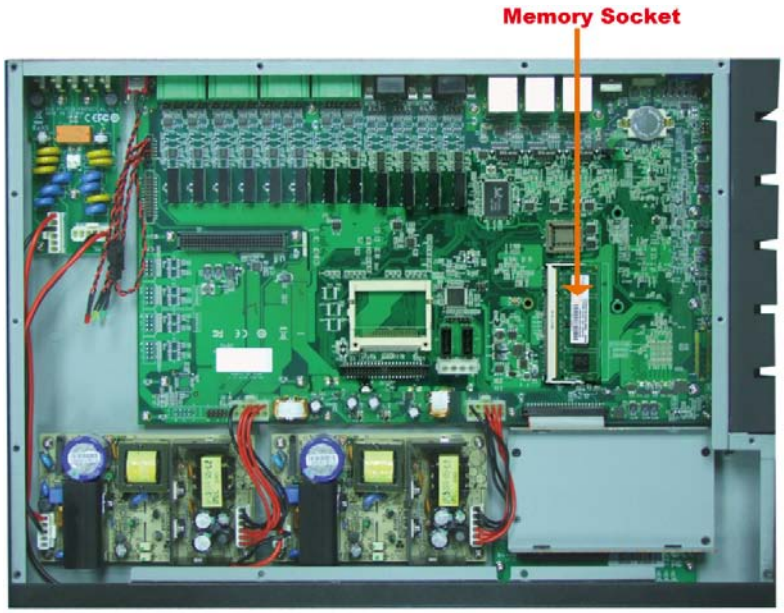
The default IP addresses and netmasks of the Gigabit LAN ports are as follows:

	Default IP Address	Netmask
LAN 1	192.168.3.127	255.255.255.0
LAN 2	192.168.4.127	255.255.255.0
LAN 3	192.168.5.127	255.255.255.0
LAN 4	192.168.6.127	255.255.255.0
LAN 5	192.168.7.127	255.255.255.0
LAN 6	192.168.8.127	255.255.255.0

Upgrading the Memory Module

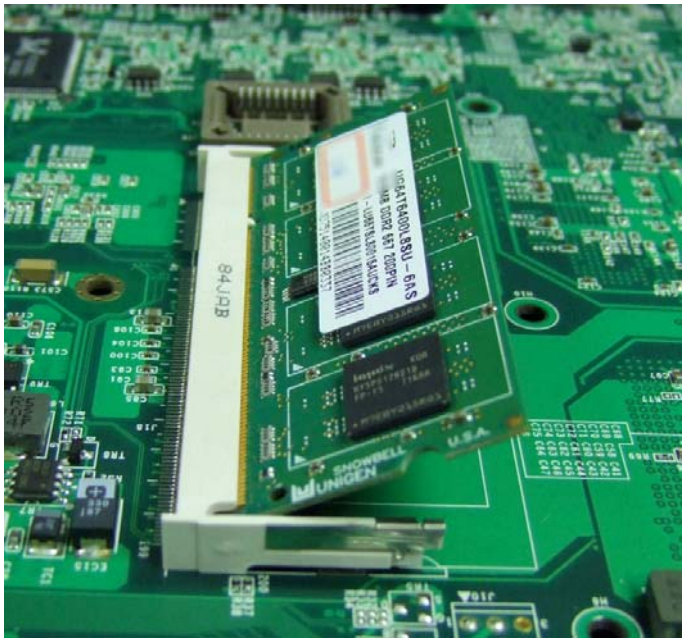
The DA-681 embedded computer supports one 200-pin DDR2 400/533 SODIMM module, up to 1 GB. One DDR2 SDRAM memory module is pre-installed. To upgrade the DDR2 SDRAM memory module, follow these instructions:

1. Disconnect the DA-681 from the power source.
2. The DA-681's memory module is located inside the DA-681. Use a screwdriver to remove the screws on the top cover of the DA-681.
3. After removing the memory module cover, you will see the DDR2 SDRAM module.



However, DDR2 SDRAM memory has been installed already. To upgrade the memory, you need to remove the original memory by pushing two clutches at both sides of the module.

Gently insert the new memory into the module. Make sure the direction is correct.

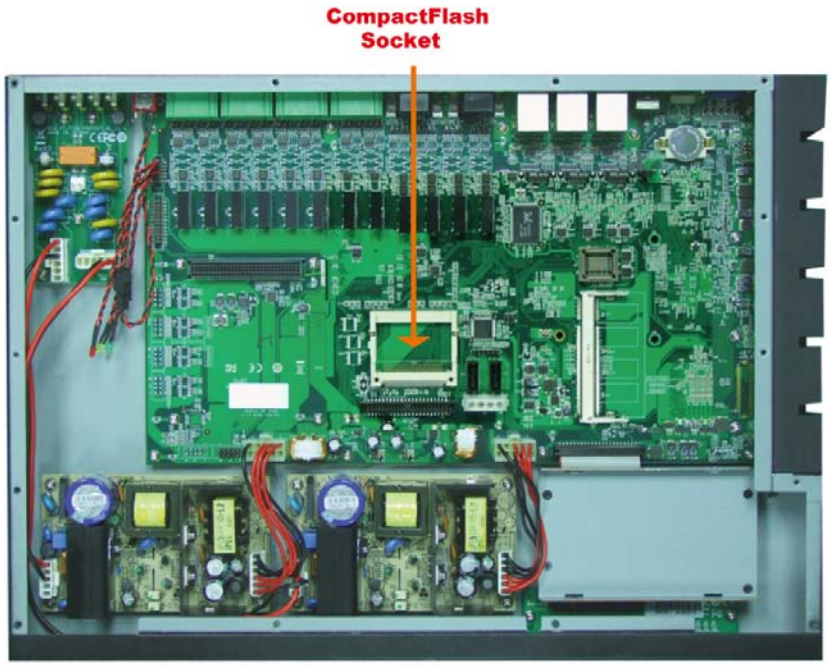


Push the memory all the way down to complete.

Installing a CompactFlash Card

The DA-681 embedded computer comes with a CompactFlash socket. To insert a CompactFlash card, follow these instructions.

1. Disconnect the DA-681 from its power source.
2. The DA-681's CompactFlash socket is located inside the DA-681. Use a screwdriver to remove all the screws on the top cover of the DA-681.



3. Insert the CompactFlash card into the socket. Push downwards to make sure that the card is firmly inserted.

ATTENTION

Make sure you insert the card in the right direction. The card cannot be inserted if you insert the card in the wrong direction.

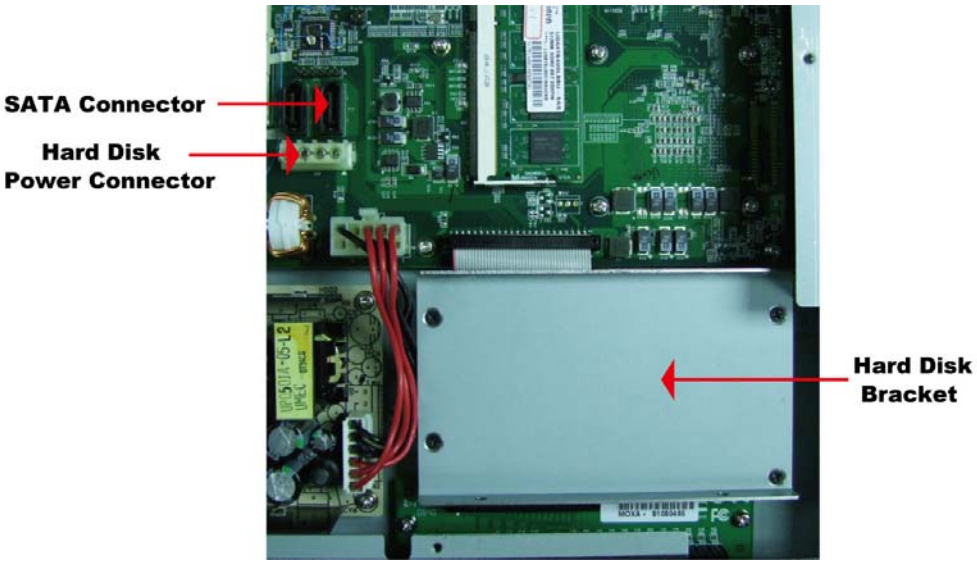
ATTENTION

The DA-681 embedded computer does not support the CompactFlash hot swap and PnP (Plug and Play) functions. It is necessary to remove power source first before inserting or removing the CompactFlash card.

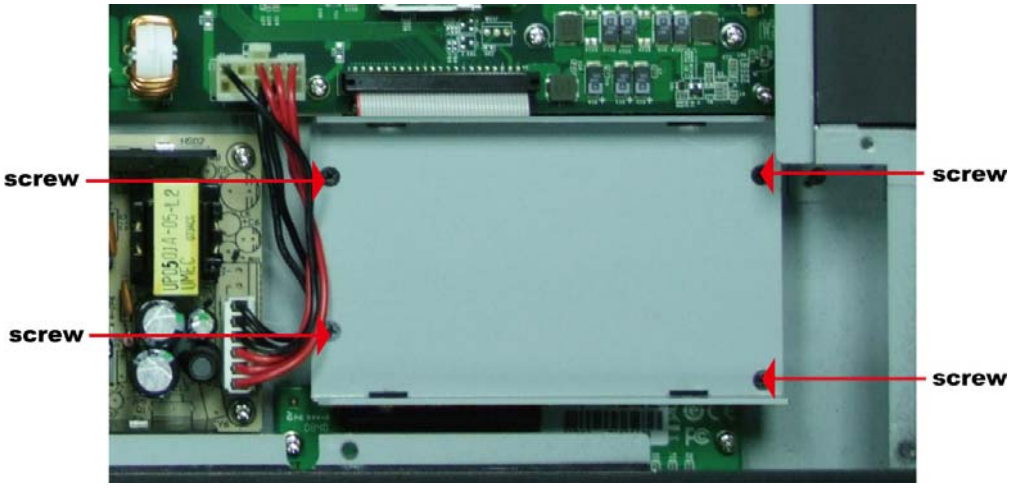
Installing a SATA Hard Disk

The DA-682 embedded computer has one SATA connector for installing a SATA hard disk. To install a 2.5-inch SATA hard disk, follow these instructions.

1. Disconnect the DA-682 from its power source.
2. Open the top cover of the DA-682. A hard disk bracket is located on the right side of the DA-682.



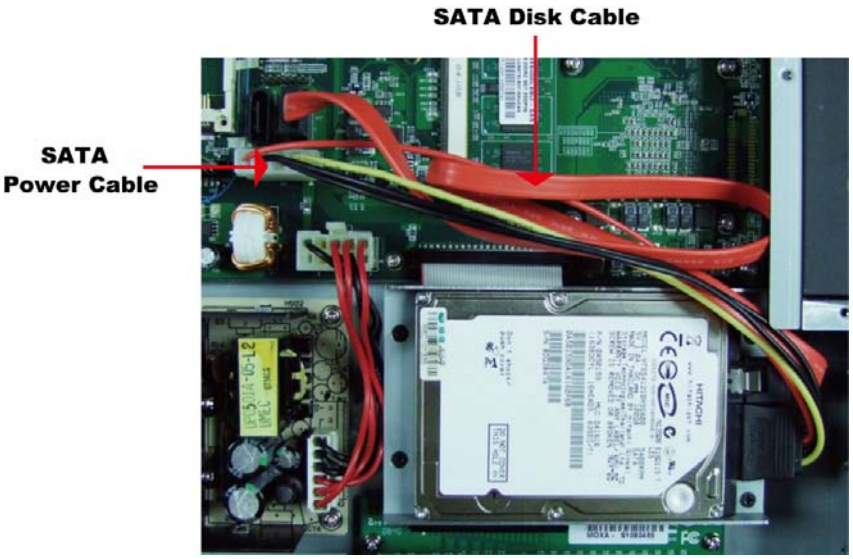
3. Use a screwdriver to remove the four screws on the hard disk bracket.



4. Install the SATA hard disk in the hard disk bracket.

5. Next, install the SATA hard disk and hard disk bracket back into the DA-681. Make sure the screws are firmly attached.

6. Connect the SATA disk cable and power cable to the SATA hard disk.



ATTENTION

The SATA hard disk cable and SATA power cable are not included in the basic shipment of the DA-681 embedded computer. Any standard SATA disk cable and power cable can be used.

3

BIOS Setup

This chapter describes the BIOS settings of the DA-681 embedded computers. The BIOS is a set of input/output control routines for peripherals. The BIOS is used to initialize basic peripherals and helps boot the operating system before the operating system is loaded. The BIOS setup allows the user to modify the system configurations of these basic input/output peripherals. All of the configurations will be stored in the battery backed up CMOS RAM, which retainsthe system information after system reboots or the power is removed.

This chapter covers the following topics:

- **Entering the BIOS Setup Utility**
- **Modifying the BIOS Main Settings**
  - Basic Configuration
  - System Security
- **Advanced Settings**
  - Hard Disk Boot Priority
  - Advanced BIOS Features
  - CPU Features
  - Advanced Chipset Settings
  - PnP/PCI Configurations
  - Frequency/Voltage Control
- **Peripherals**
  - OnChip IDE Device
  - Onboard Device
  - Onboard I/O Chip Setup
- **Power**
  - Wake Up Control
- **Hardware Monitor**
- **Load Defaults**
- **Exiting the BIOS Setup**
- **Upgrading the BIOS**

Entering the BIOS Setup Utility

To enter the BIOS setup utility, press the "Del" key while the system is booting up. The main BIOS Setup screen will appear.

A basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to scroll about the screen, how to select by pressing "Enter," and how to use the other hot keys listed below.

F1: General Help

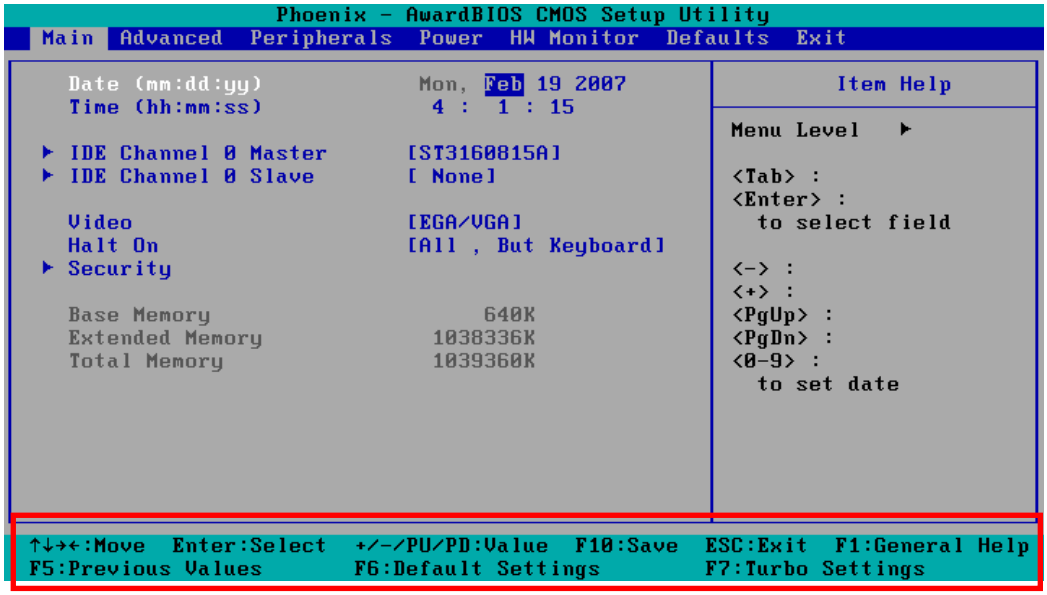
F5: Previous Value

F6: Default Settings

F7: Turbo Settings

F10: Save

ESC: Exit



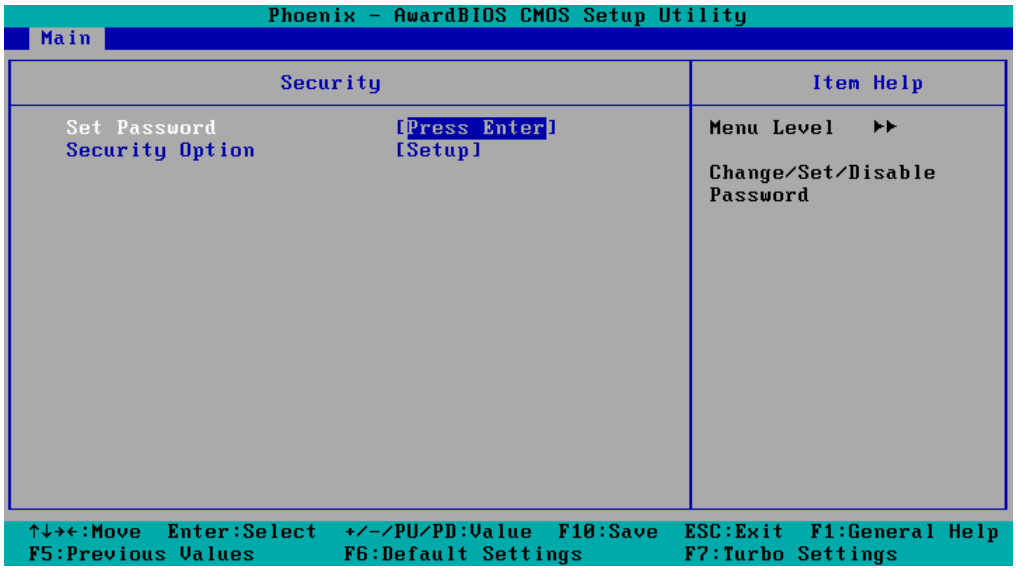
Modifying the BIOS Main Settings

Basic Configuration

After entering the BIOS Setup, or choosing the "Main" option, the BIOS main menu will be displayed. Use this menu to check the basic system information such as memory and IDE hard drive. You can also use the menu for configuring basic system parameters, such as date, time, hard drive, display, and system security.

System Security

To set up system security, select the "Security" option under "Main" to bring up the following screen.



This menu includes two options: "Set Password" and "Security Option."

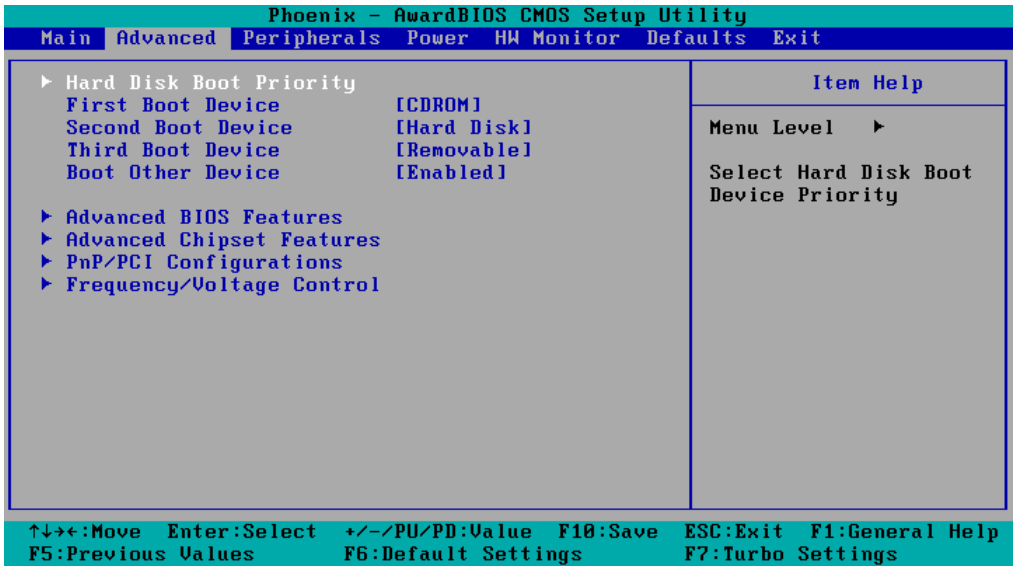
When you select the Set Password option, a pop-up "Enter Password:" window will appear on the screen. The password that you type will replace the password stored in the CMOS memory. You will be required to confirm the new password. Just re-type the password and then press **<Enter>**. You may also press **<Enter>** to abort the selection and not enter a password.

To clear an existing password, just press **<Enter>** when you are prompted to enter the password. A message will show up confirming that the password will be disabled. Once the password is disabled, the system will boot and you can enter the "BIOS Setup Menu" without entering a password.

Once a password has been set, you will be prompted to enter the password each time you enter Setup. This prevents unauthorized persons from changing any part of your system configuration. In addition, when a password setting is enabled, you can set up the BIOS to request a password each time the system is booted up. The "Security Option" setting determines when a password prompt is required. If the "Security Option" is set to "System," the password must be entered both at boot up and when entering the BIOS Setup Menu. If the password is set for "Setup," the password prompt only occurs when you enter the "BIOS Setup Menu."

Advanced Settings

The "Advanced Features" screen will appear when choosing the "Advanced" item from the main menu.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Hard Disk Boot Priority
First Boot Device [CDROM]
Second Boot Device [Hard Disk]
Third Boot Device [Removable]
Boot Other Device [Enabled]
Advanced BIOS Features
Advanced Chipset Features
PnP/PCI Configurations
Frequency/Voltage Control
Item Help
Menu Level ▶
Select Hard Disk Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Hard Disk Boot Priority

First/Second/Third Boot Device

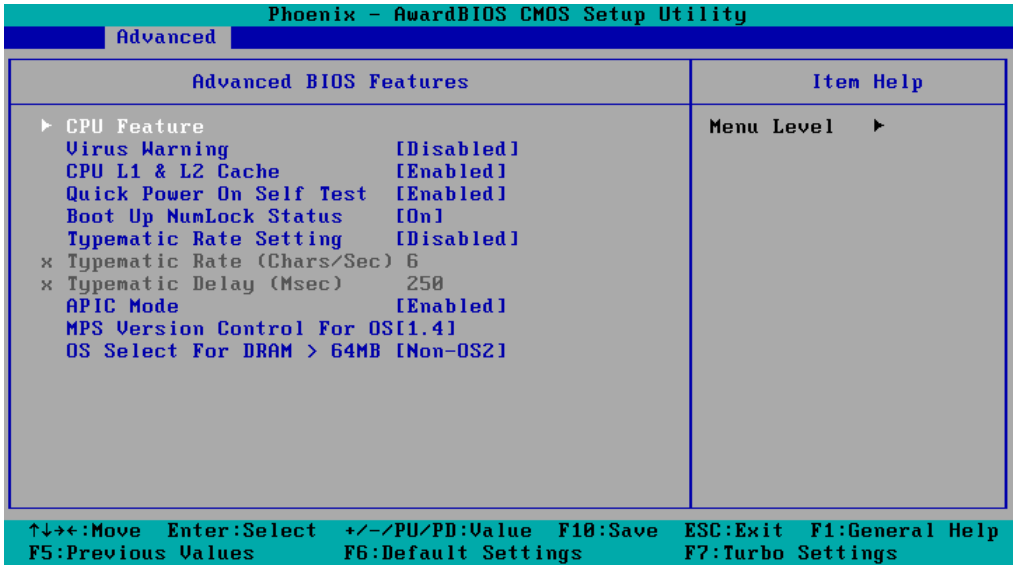
This option allows users to select or change the device boot priority. You may set 3 levels of priority to determine the boot up sequence for different bootable devices, such as a hard drive, CD-ROM, and removable devices. Select the order in which devices will be searched in order to find a boot device. The available options are "CDROM (default for first boot device)," "Removable" (default for third boot device), "Hard Disk" (default for second boot device) and "Disabled."

Boot Other Devices

This setting allows the system to try to boot from other devices if the system fails to boot from the 1st, 2nd, or 3rd boot devices. The options are "Enabled" (default) and "Disabled."

Advanced BIOS Features

When you select the "Advanced BIOS Features" option under the "Advanced" menu, the following configuration menu will appear.


Phoenix - AwardBIOS CMOS Setup Utility
Advanced
Advanced BIOS Features
Item Help
▸ CPU Feature
Menu Level ▸
Virus Warning [Disabled]
CPU L1 & L2 Cache [Enabled]
Quick Power On Self Test [Enabled]
Boot Up NumLock Status [On]
Typematic Rate Setting [Disabled]
x Typematic Rate (Chars/Sec) 6
x Typematic Delay (Msec) 250
APIC Mode [Enabled]
MPS Version Control For OS[1.4]
OS Select For DRAM > 64MB [Non-OS2]
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

CPU Features

Virus Warning

This item allows you to choose the VIRUS warning feature for IDE hard disk boot sector protection. If this function is enabled and someone attempts to write data into this area, the BIOS will display a warning message on the screen and sound an audio alarm (beep).

Options: Disabled (default), Enabled.

CPU L1 & L2 Cache

Make the CPU internal cache active or inactive. System performance may degrade if you disable this item.

Options: Enabled (default), Disabled.

Quick Power on Self Test

This setting allows the system to skip certain tests while the system boots up. Enable this feature to speed up the boot up process.

Options: Enabled (default), Disabled.

Boot Up NumLock Status

Select the power on state for NumLock.

Options: On (default), Numpad keys are number keys.

Off, Numpad keys are arrow keys.

Typematic Rate Setting

When "Enabled" both "Typematic Rate" and "Typematic Delay" can be configured. Typematic Rate determines the keystroke repeat rate used by the keyboard controller.

Options: Disabled (default), Enabled

Typematic Rate (Chars/Sec)

The rate at which the keyboard will repeat a keystroke if users press key continuously.

Typematic Delay (milliseconds)

The delay before keystrokes begin to repeat.

Options: 250 ms (default), 500 ms, 750 ms, 1000 ms

APIC Mode

Set the "Advanced Programmable Interrupt Controller" as active or inactive.

Options: Disabled, Enabled (default)

MPS Version Control for OS

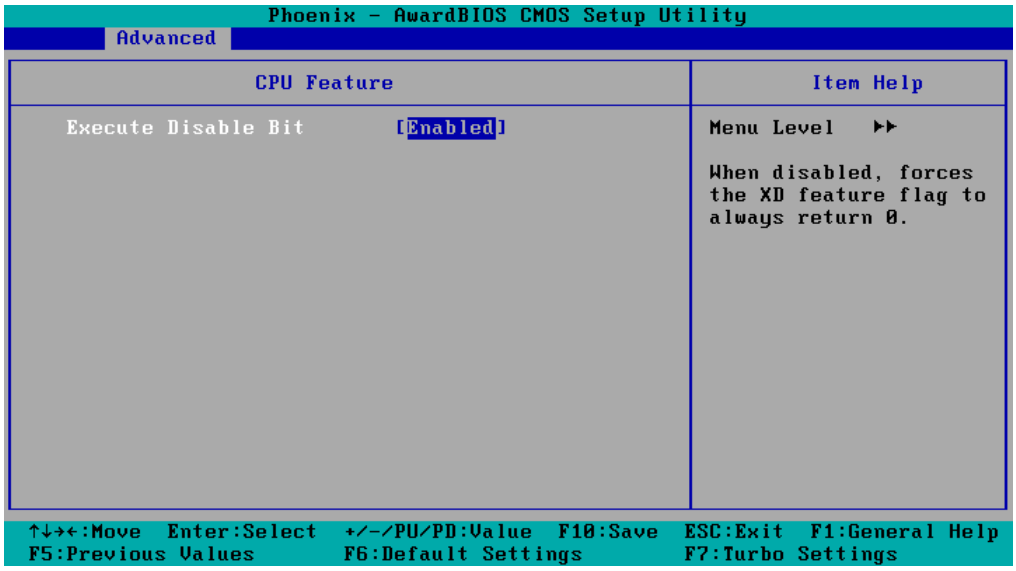
Set the "Multi-Processor Specification." 1.1 was the original specification. MPS version 1.4 adds extended configuration tables for improved support for multiple PCI bus configurations and greater expandability. In addition, MPS 1.4 introduces support for a secondary PCI bus without requiring a PCI bridge.

Options: 1.1, 1.4 (default)

OS Select for DRAM > 64 MB

Select "OS2" only if you are running the OS/2 operating system with greater than 64 MB of RAM.

Options: Non-OS2 (default), OS2

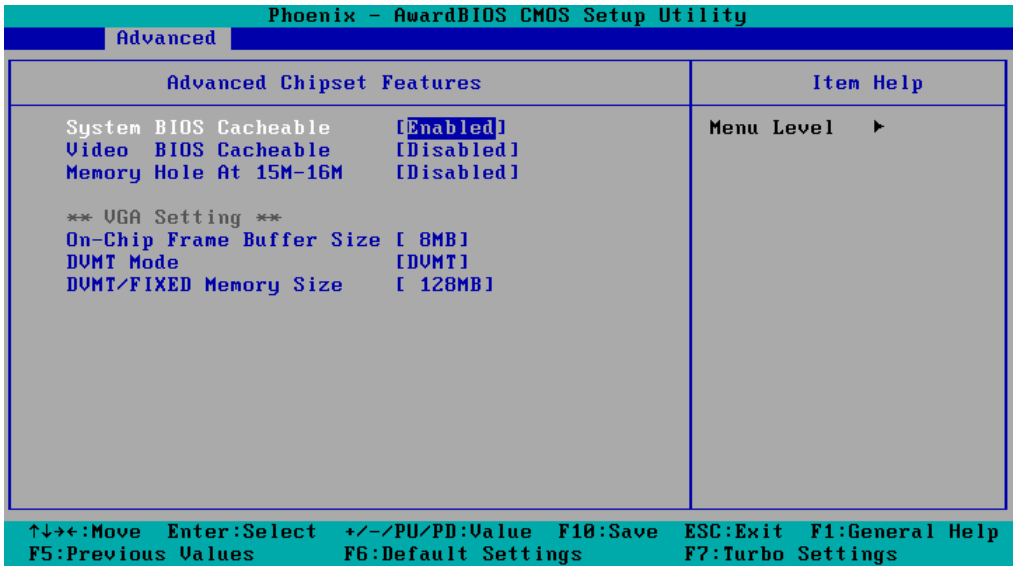

Phoenix - AwardBIOS CMOS Setup Utility
Advanced
CPU Feature
Item Help
Execute Disable Bit [Enabled]
Menu Level ▸▸
When disabled, forces the XD feature flag to always return 0.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Execute Disable Bit

Intel hardware-based security feature can help reduce system exposure to viruses and malicious code.

Options: Enabled (default), Disabled.

Advanced Chipset Settings


Phoenix - AwardBIOS CMOS Setup Utility
Advanced
Advanced Chipset Features
Item Help
System BIOS Cacheable [Enabled]
Video BIOS Cacheable [Disabled]
Memory Hole At 15M-16M [Disabled]
** VGA Setting **
On-Chip Frame Buffer Size [8MB]
DVMT Mode [DVMT]
DVMT/FIXED Memory Size [128MB]
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

System BIOS Cacheable

The BIOS ROM addresses F0000h to FFFFFh are cached, and the cache controller is enabled to access the system. Enable it to speed up system performance.

Options: Enabled (default), Disabled

Video BIOS Cacheable

Enabling this feature allows the caching of the video BIOS and may improve performance. A system error could occur if another program writes to this memory cache area.

Options: Enabled, Disabled (default)

Memory Hole at 15M-16M

When enabled, the system will reserve a system memory area for the ISA adapter ROM, and this memory area will not be available for caching.

Options: Enabled, Disabled (default)

On-Chip Frame Buffer Size

This item determines the frame buffer size for the VGA function, and will share the system memory.

Options: 1 MB, 8 MB (default)

DVMT Mode

Setting the DVMT operating mode. When set to "Fixed," the graphics driver will reserve a fixed portion of the system memory as graphics memory. When set to "DVMT," the graphics driver will dynamically allocate system memory as graphics memory, according to system and graphics requirements. When set to "BOTH," the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

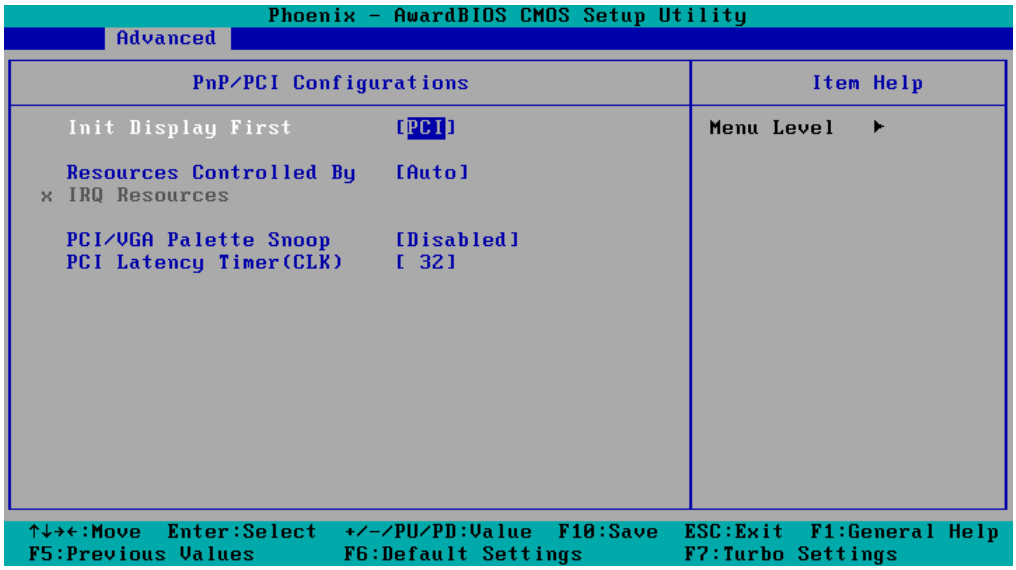
Options: FIXED, DVMT (default), BOTH

DVMT/FIXED Memory Size

Sets the maximum amount of system memory that can be allocated as graphics memory.

Options: 64 MB, 128 MB (default).

PnP/PCI Configurations



Init Display First

This item allows you to decide whether the PCI interface or onboard graphic chip is activated first.

Options: PCI (default), Onboard

Resources Controlled By

The BIOS can automatically configure all boot and Plug and Play compatible devices. If you choose Auto, you will not be able to assign IRQ and memory base address fields manually, since the BIOS assigns them automatically.

Options: Auto (default), Manual

IRQ Resources

When resources are controlled manually, you can assign each system interrupt to Reserved or PCI device. This is only configurable when "Resources Controlled By" is set to "Manual."

Options: IRQ 3, 4, 5, 7, 10, 11 for PCI device.

PCI/VGA Palette Snoop

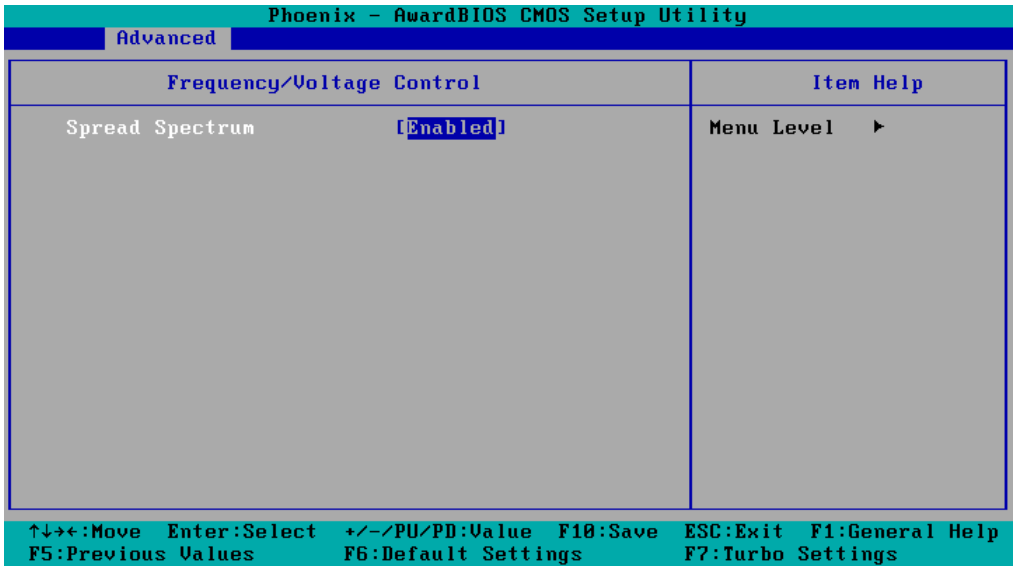
This item can be used to fix the color display error of non-standard VGA display adaptors such as graphics accelerators or MPEG video cards.

Options: Disabled (default), Enabled

PCI Latency Timer (CLK)

Configure PCI Latency Time to optimize the PCI speed. The range of possible values is "0" to "255" with a default value of "32."

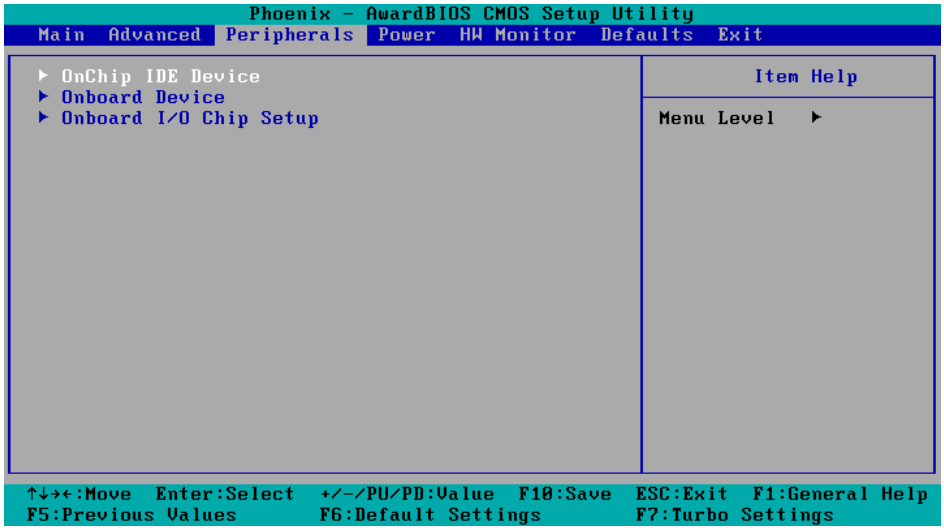
Frequency/Voltage Control



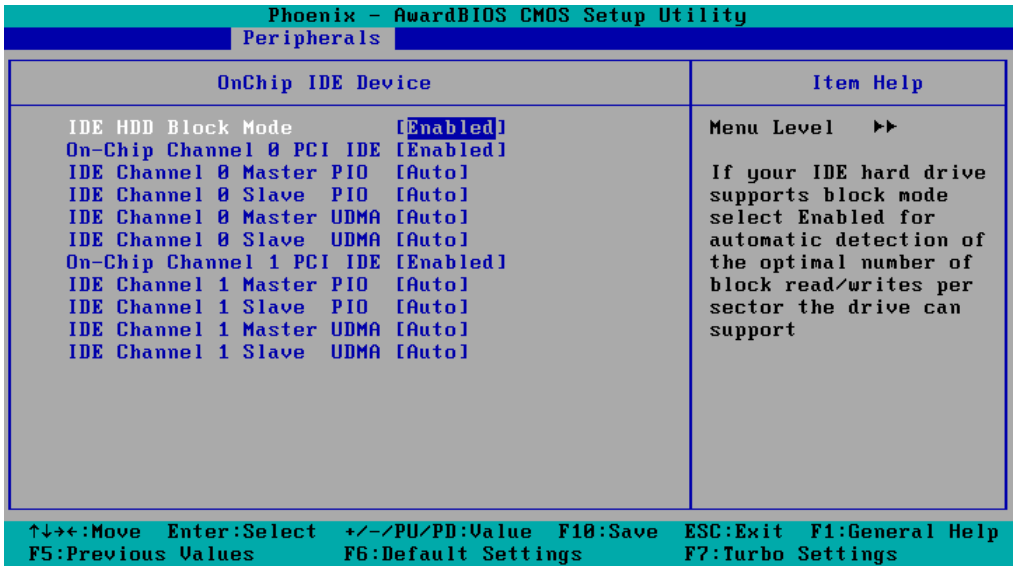
Spread Spectrum

Select "Enabled" to reduce EMI (Electromagnetic Interference). The default is "Enabled."

Peripherals


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
▶ OnChip IDE Device
▶ Onboard Device
▶ Onboard I/O Chip Setup
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

OnChip IDE Device


Phoenix - AwardBIOS CMOS Setup Utility
Peripherals
OnChip IDE Device
Item Help
IDE HDD Block Mode [Enabled]
On-Chip Channel 0 PCI IDE [Enabled]
IDE Channel 0 Master PIO [Auto]
IDE Channel 0 Slave PIO [Auto]
IDE Channel 0 Master UDMA [Auto]
IDE Channel 0 Slave UDMA [Auto]
On-Chip Channel 1 PCI IDE [Enabled]
IDE Channel 1 Master PIO [Auto]
IDE Channel 1 Slave PIO [Auto]
IDE Channel 1 Master UDMA [Auto]
IDE Channel 1 Slave UDMA [Auto]
Menu Level ▸▸
If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

IDE HDD Block Mode

Block mode is otherwise known as block transfer, multiple commands, or multiple sector read/write. Select the "Enabled" option if your IDE hard drive supports block mode (most new drives do). The system will automatically determine the optimal number of blocks to read and write per sector.

Options: Enabled (default), Disabled

On-Chip Channel 0/1 PCI IDE

This item lets users enable or disable the IDE channel.

Options: Disabled, Enabled (default)

IDE Channel 0/1 Master/Slave PIO

The IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the IDE devices that the onboard IDE interface supports. Modes 0 to 4 will increase performance incrementally. In Auto mode, the system automatically determines the best mode for each device.

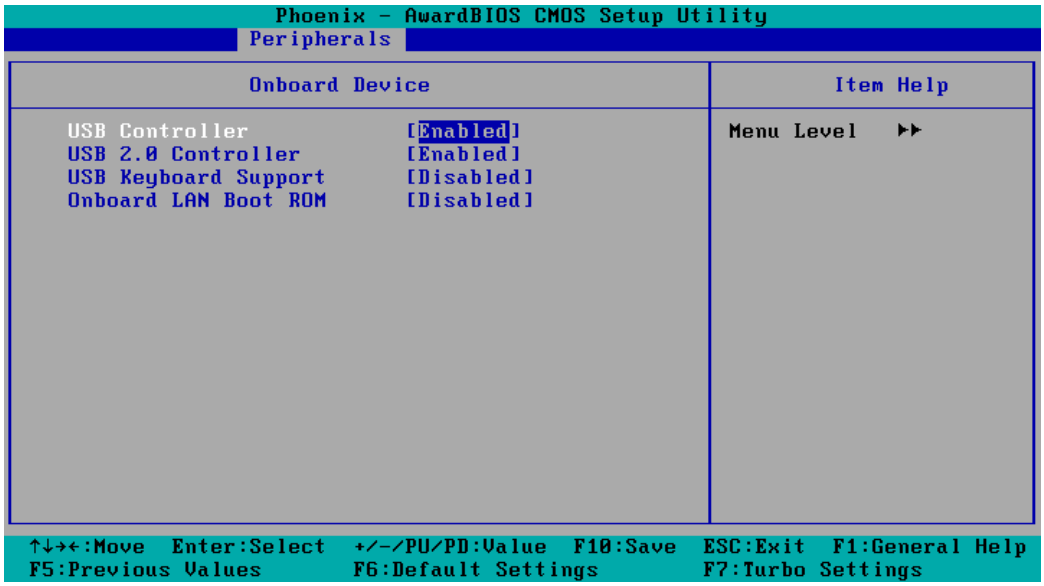
Options: Auto (default), Mode0, Mode1, Mode2, Mode3, Mode4

IDE Channel 0/1 Master/Slave UDMA

Ultra DMA functionality can be implemented if it is supported by the IDE hard drives in your system. Your operating environment also requires a DMA driver (Windows 95 OSR2 or a third party IDE bus master driver). If your hard drive and your system software both support Ultra DMA, select "Auto" to enable BIOS support.

Options: Auto (default), Disabled

Onboard Device



USB Controller

This feature allows you to enable/disable the USB controller.

Options: Enabled (default), Disabled

USB 2.0 Controller

This feature allows you to enable/disable the USB 2.0 controller.

Options: Enabled (default), Disabled

USB Keyboard Support

This item is useful for DOS systems. Enable it if you want to use a USB keyboard under a DOS environment.

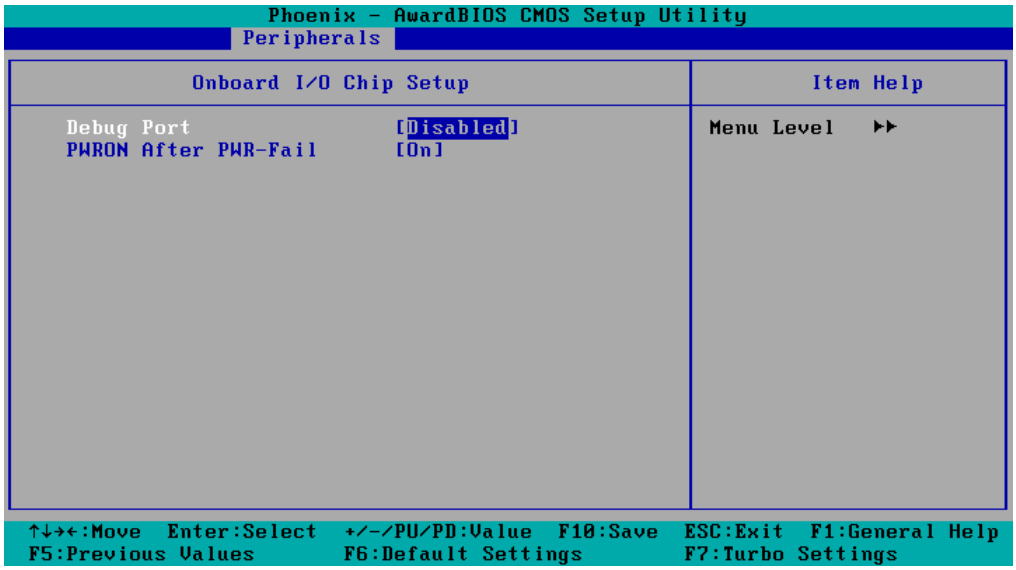
Options: Enabled, Disabled (default)

Onboard LAN Boot ROM

Decide whether to invoke the boot ROM of the onboard LAN chip.

Options: Enabled, Disabled (default)

Onboard I/O Chip Setup


Phoenix - AwardBIOS CMOS Setup Utility
Peripherals
Onboard I/O Chip Setup
Item Help
Debug Port [Disabled]
PWRON After PWR-Fail [On]
Menu Level ▸▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Debug Port

Select an address and corresponding interrupt for this debug port. This port is only for engineers who are debugging programs.

Options: Disabled (default), 3F8/IRQ4

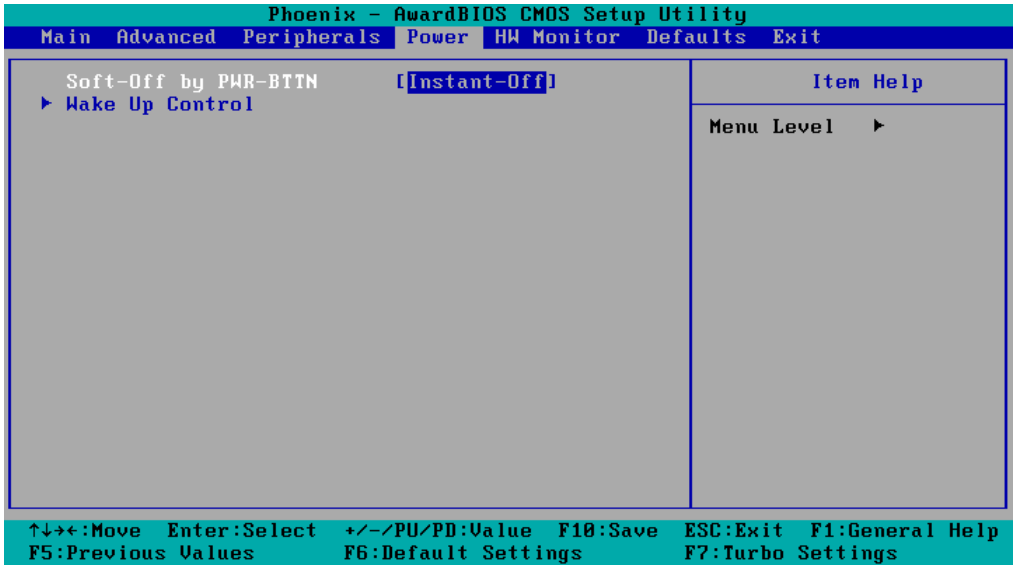
PWRON after PWR-Fail

This field determines whether your system will boot after restoring power from a power failure. If you select "On," the system will boot after restoring power from a power failure. If you select "Former-Sts" (Forrner Status), the system will boot or not, depending on the status before the power failure.

Options: Off, On (default), Former-Sts.

Power

The Power Setup Menu allows you to configure your system power-up/ power-down options.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Soft-Off by PWR-BTTN [Instant-Off]
Wake Up Control
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Soft-Off by PWR-BTTN

Select the "Instant-Off" option if you would like the system to power down immediately after pushing the power button. Selecting the "Delay 4 Sec" option will require pushing the power button continuously for at least 4 seconds before the system powers down.

Options: Delay 4 Sec, Instant-Off (default).

Wake Up Control

Press "Enter" to select Wake Up Control items.

Lan Wake up

This feature is used to wake up the system by a LAN device from a remote host.

Options: Disabled (default), PCI

RTC Wake Up

When "Enabled," you can set the date and time at which the RTC (real-time clock) alarm awakens the system from Suspend mode.

Options: Disabled (default), Enabled.

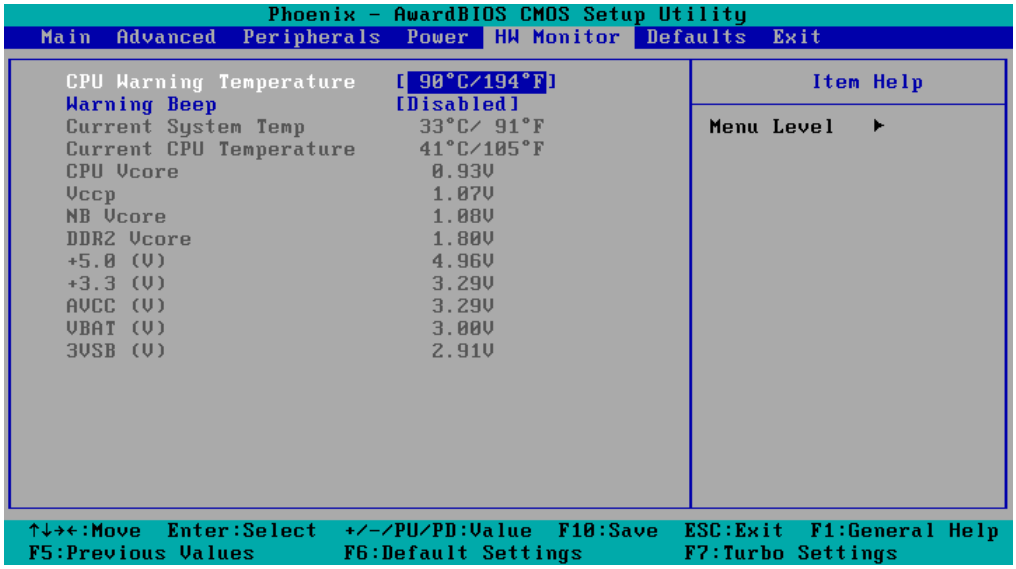
Date (of Month) Alarm

Set the "date" for the "RTC Wake Up" function when "RTC Wake Up" is set to "Enabled."

Time (hh: mm: ss) Alarm

You can set the hour, minute, and second of the "RTC Wake Up" function when "RTC Wake Up" is set to "Enabled."

Hardware Monitor



CPU Warning Temperature

This item sets the CPU warning temperature. When the CPU temperature is higher than this setting, the system will throttle down to 75%. When the CPU temperature is higher than this setting plus 10°C, the system will throttle down to 50%.

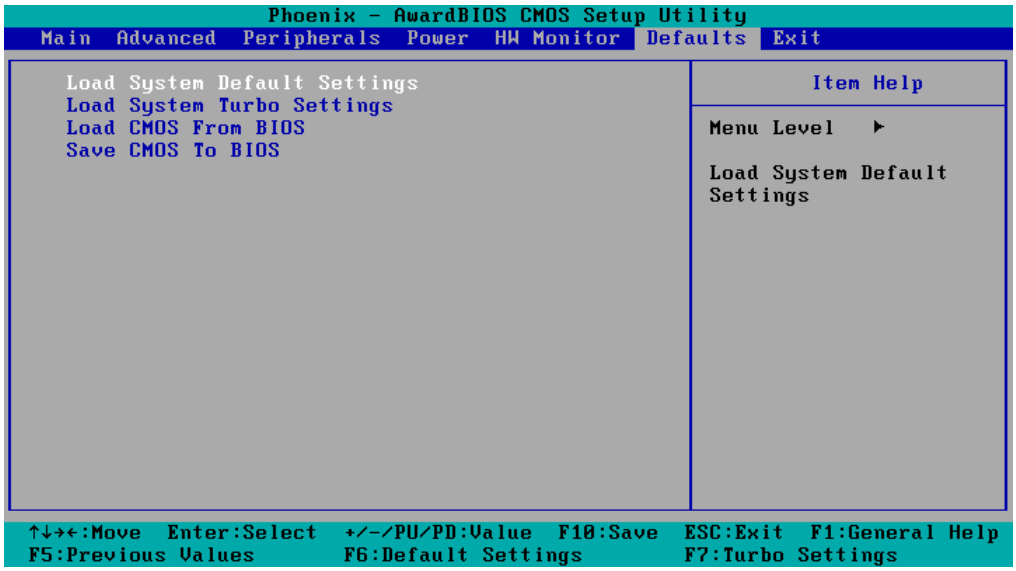
Options: 80°C/176°F, 90°C/194°F (default), 100°C/212°F, Disabled.

Warning Beep

Set the beep to sound or not sound when the CPU temperature is over the CPU warning temperature.

Options: Disabled (default), Enabled.

Load Defaults


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Load System Default Settings
Load System Turbo Settings
Load CMOS From BIOS
Save CMOS To BIOS
Item Help
Menu Level ▶
Load System Default Settings
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Load System Default Settings

Use this option to load system factory default settings instead of the current BIOS settings. This option is useful for when the system is unstable. Users do not need to remember what settings were active before the system fails.

Load System Turbo Settings

Use this option to load system optimized settings. If the system is not stable, please load the system default settings.

Load CMOS from BIOS

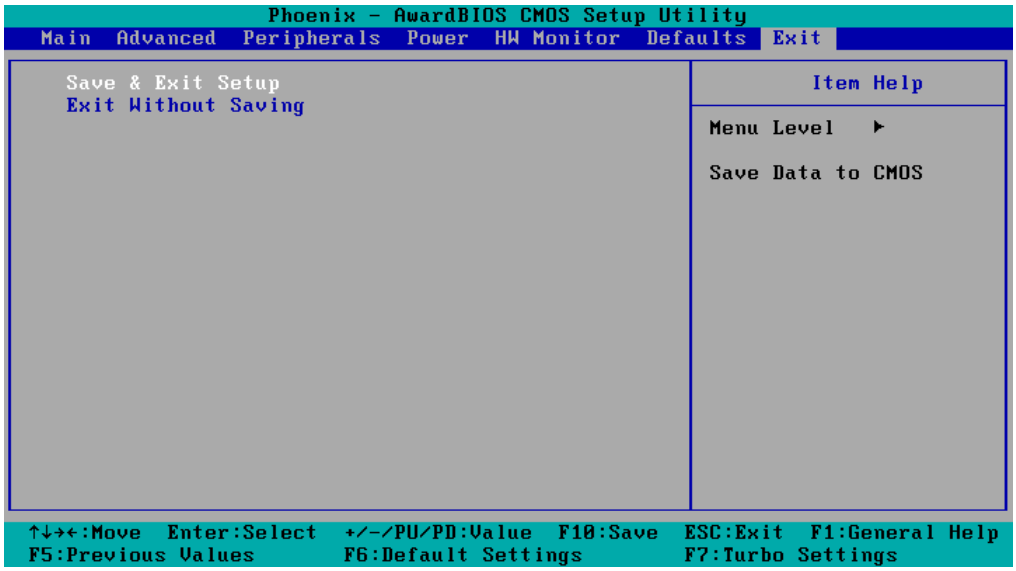
Use this option to load BIOS settings from flash ROM to CMOS.

Save CMOS to BIOS

Use this option to save the BIOS settings from the CMOS to flash ROM.

Exiting the BIOS Setup

To exit the BIOS setup utility, choose "Exit." Pressing **<ESC>** will achieve the same result.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Save & Exit Setup
Exit Without Saving
Item Help
Menu Level ▸
Save Data to CMOS
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Save & Exit Setup

Save all configuration changes to CMOS (memory) and exit setup. A confirmation message will be displayed before proceeding.

Exit Without Saving

Abandon all changes made during the current session and exit setup. A confirmation message will be displayed before proceeding.

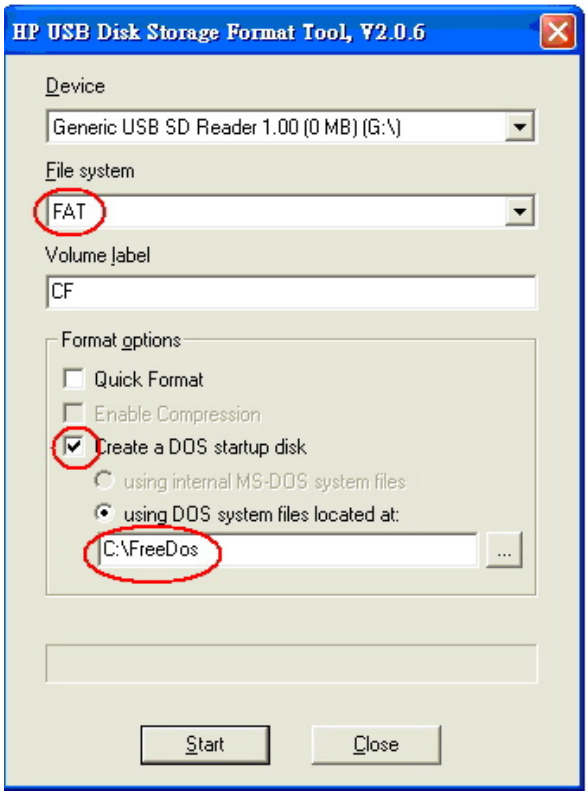
Upgrading the BIOS

This section describes how to upgrade the bios.

Step 1: Create a Bootable USB Disk.

There are two recommended methods for creating a bootable USB disk:

Method 1: Use HP USB Disk Format Tool



1. Download FreeDOS system files **kernel.sys** and **command.com** from http://www.freedos.org/kernel/
2. Copy DOS system files **kernel.sys** and **command.com** to a specified directory (**C:\FreeDOS** in this example).
3. Start the HP USB Disk Storage Format Tool and select the USB device that you want to use as a bootable disk in the **Device** drop down box.
4. Select FAT in the **File system** drop down box.
5. Type the disk name in the **Volume label field**.
6. Check the option **Create a DOS startup disk** under format options.
7. Specify the directory of the system files (for example, **C:\FreeDOS**).
8. Click **Start** to format and create the USB disk.

ATTENTION

HP's USB Disk Storage Format Tool can be downloaded from many web sites. Use the phrase "HP USB Disk Storage Format Tool" to search the Internet, and then download the tool from one of the websites that is listed.

Method 2: Use the BootFlashDOS utility.

Run the BootFlashDOS utility and then press **Start**.

ATTENTION

The BootFlashDOS utility can be downloaded from the following website: http://gocoding.com/page.php?al=bootflashdos.

Step 2: Prepare the Upgrade Tool and BIOS Binary File.

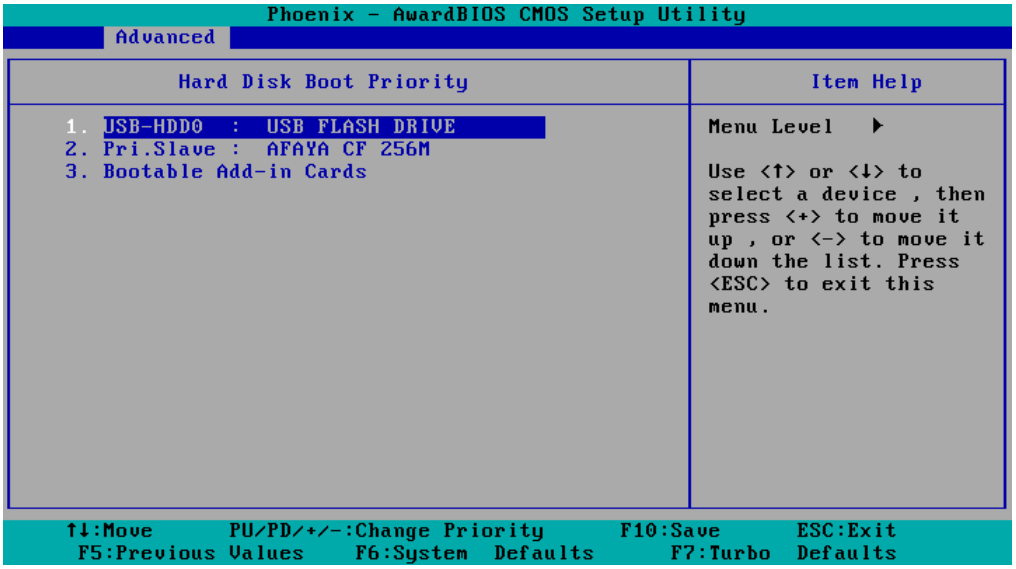
You must use the BIOS upgrade installation file to upgrade the BIOS. You can download it from the Moxa Download Center at:

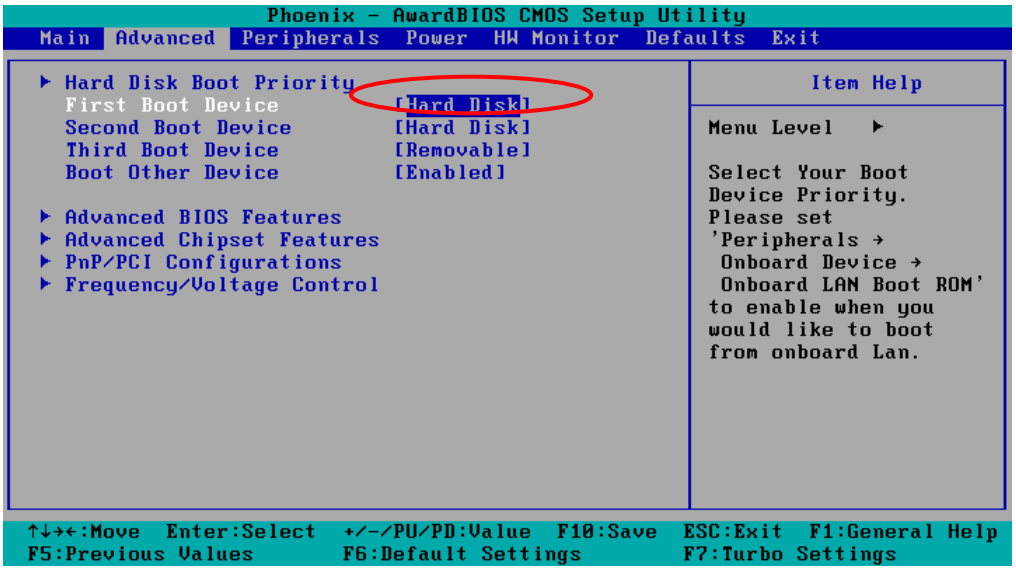
http://web4.moxa.com/support/download_center.asp

1. Get the BIOS upgrade installation file. The file name should have following format: **BIOS_DA-68X_V1.0_Build_08042310.zip**.
2. Copy the file to the Bootable USB Disk.
3. Double click to extract the BIOS update installation file. The file includes a binary file in the form xxxxxxx.Sxx and the upgrade utility named **awdflash.exe**.

Step 3: Set up the BIOS to Boot from the USB Disk.

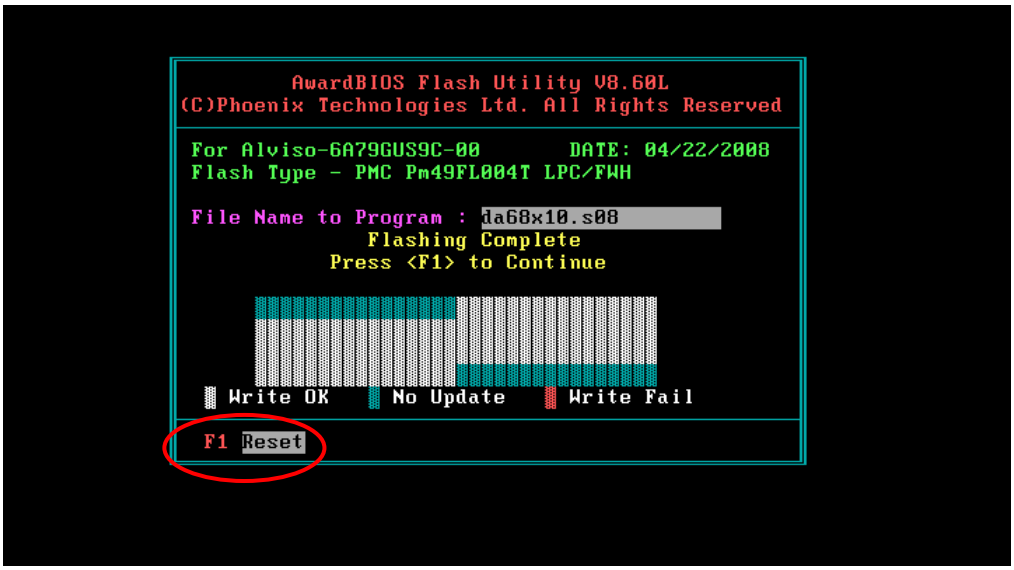
1. Insert the USB disk.
2. Power on and press **DEL** to enter the BIOS Setup menu.
3. Select **Advanced → Hard Disk Boot Priority** and then press **Enter**.
4. From the Setup menu, use "↑" or "↓" to select the USB device.
5. Press "+" to move it up to the first priority, and press "Esc" to exit the setup menu.
6. Make sure the first boot device is **Hard Disk**. If it isn't, press **Enter** to change it.
7. Select **Exit → Save & Exit Setup** and then press **Enter**.
8. Choose **Y** to save to the CMOS and then exit.


Phoenix - AwardBIOS CMOS Setup Utility
Advanced
Hard Disk Boot Priority
Item Help
1. USB-HDD0 : USB FLASH DRIVE
2. Pri.Slave : AFAYA CF 256M
3. Bootable Add-in Cards
Menu Level ▶
Use <↑> or <↓> to select a device , then press <+> to move it up , or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓:Move PU/PD/+/-:Change Priority F10:Save ESC:Exit
F5:Previous Values F6:System Defaults F7:Turbo Defaults


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
▶ Hard Disk Boot Priority
First Boot Device [Hard Disk]
Second Boot Device [Hard Disk]
Third Boot Device [Removable]
Boot Other Device [Enabled]
▶ Advanced BIOS Features
▶ Advanced Chipset Features
▶ PnP/PCI Configurations
▶ Frequency/Voltage Control
Item Help
Menu Level ▶
Select Your Boot Device Priority. Please set 'Peripherals → Onboard Device → Onboard LAN Boot ROM' to enable when you would like to boot from onboard Lan.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

Step 4: Run awdflash.exe to upgrade the BIOS.

1. If the BIOS Setup is correct, it will restart and boot from the USB disk.
2. Run **awdflash xxxxxxx.Sxx** from the command line to upgrade the BIOS. Replace xxxxxxx.Sxx with the BIOS binary file name discussed in Step 2.
3. Press **F1** to reset the system after the bios update is complete. The system should reboot at this time.

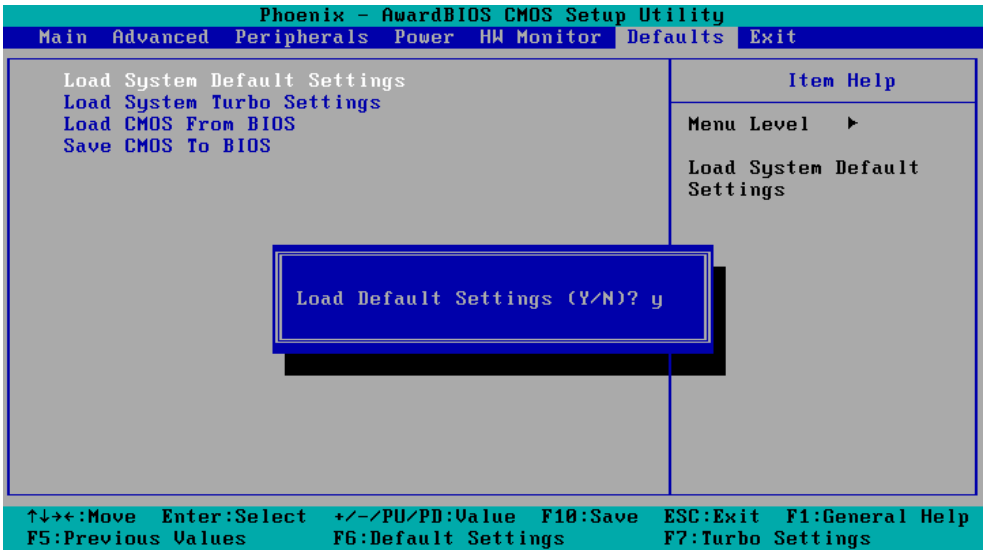


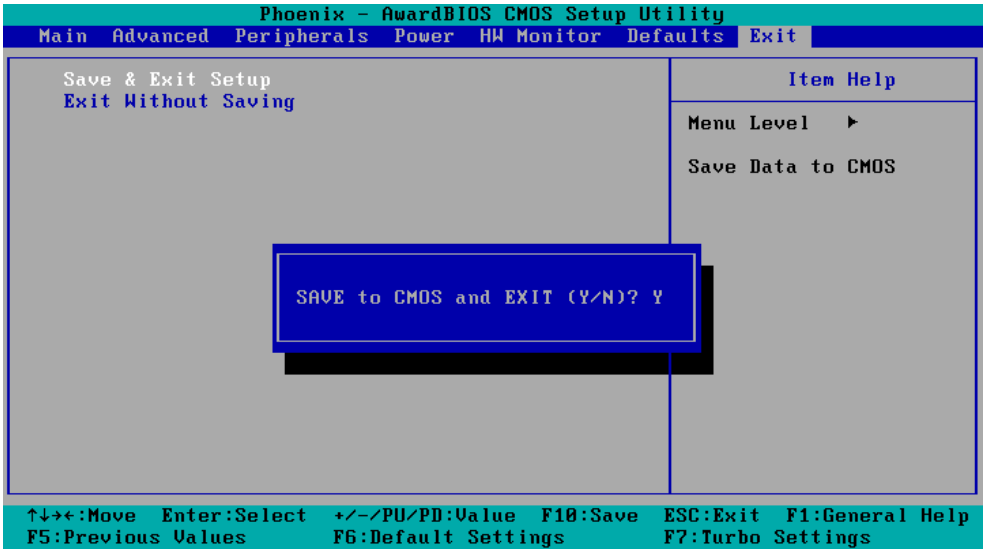
ATTENTION

Do **NOT** switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.

Step 5: Load BIOS Default.

1. When the system reboots, the user should load the CMOS Setup default value again.
2. Press **DEL** to open the BIOS Setup menu.
3. Select **Defaults → Load System Default Settings** and then choose **Y**.
4. Select **Exit → Save & Exit Setup** and then press **Enter** to choose **Y** to save the settings to CMOS and exit.


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Load System Default Settings
Load System Turbo Settings
Load CMOS From BIOS
Save CMOS To BIOS
Item Help
Menu Level ▸
Load System Default Settings
Load Default Settings (Y/N)? y
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings


Phoenix - AwardBIOS CMOS Setup Utility
Main Advanced Peripherals Power HW Monitor Defaults Exit
Save & Exit Setup
Exit Without Saving
Item Help
Menu Level ▸
Save Data to CMOS
SAVE to CMOS and EXIT (Y/N)? Y
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Default Settings F7:Turbo Settings

A

Safety Installation Instructions

A. RTC Battery Warning

CAUTION: There is a risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

B. Fuse Warning

CAUTION: For continued protection against fire, replace only with same type and rating of fuse.

C. Rackmount Warning

The following or similar rackmount instructions are included with the installation instructions:

(1) Elevated Operating Ambient: If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

(2) Reduced Air Flow: Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

(3) Mechanical Loading: Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

(4) Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

(5) Reliable Grounding: Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., by using power strips).

B

Regulatory Statement Approval

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A: FCC Warning! This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

European Community

Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.